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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/073,877	02/14/2002	Takayuki Watanabe	020166	6745

23850 7590 08/22/2003

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EXAMINER

GUERRERO, MARIA F

ART UNIT PAPER NUMBER

2822

DATE MAILED: 08/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/073,877

Applicant(s)

WATANABE ET AL.

Examiner

Maria Guerrero

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 February 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-2, 13, 17, and 19-21 is/are rejected.
- 7) ☒ Claim(s) 3-12, 14-16 and 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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DETAILED ACTION

1. This Office Action is the First Action on the merits.

Claims 1-21 are pending.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-2, 13, 17, and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Otsuka et al. (U.S. 5,568,501) in view of Fujihara et al. (U.S. 5,227,015).

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Otsuka et al. teaches forming a stacked structure of a first III-V compound semiconductor layer (2) (InGaAsP) containing In and having a composition different from InP and forming a second III-V compound semiconductor layer (InGaAsP) containing In over the first III-V compound semiconductor layer (Fig. 1A-2A, 3A-3B, col. 6, lines 55-67, col. 7, lines 1-5, 30-40). Otsuka et al. shows growing an InP layer at regions adjacent the stacked structure to form a stepped structure of InP (Fig. 2A, 3C, col. 7, lines 9-15, 30-35). In addition, Otsuka et al. teaches wet-etching the stepped structure and the second III-V compound semiconductor layer using an etchant containing acetic acid (Fig. 2A, col. 7, lines 35-50).

Furthermore, Otsuka et al. shows using an etchant containing hydrochloric acid to adjust the stripe height (col. 7, lines 40-45). Otsuka et al. discloses removing the second III-V compound semiconductor layer using an etchant containing acetic acid (Fig. 3B-3C, col. 9, lines 40-47). Otsuka et al. teaches obtaining a planar surface on a (001) plane (Fig. 2A, 3C, col. 8, lines 30-33, col. 14, lines 35-45).

Otsuka et al. does not expressly teach the etchant containing hydrochloric acid, acetic acid, and water. However, Fujihara et al. teaches using the etchant containing hydrochloric acid, acetic acid, and water during a semiconductor laser fabrication process is well known in the art (Abstract).

Since, Otsuka et al. and Fujihara et al. are both from the same field of endeavor of fabricating semiconductor lasers, the purpose disclosed by Fujihara et al. would have been recognized in the pertinent art of Otsuka et al.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to recognize that the etchant disclosed by Otsuka et al. would contain hydrochloric acid, acetic acid, and water as taught Fujihara et al. because this etchant is conventional used in the art. The modification would provide a semiconductor laser with high reliability in which current leakage is reduced (Fujihara et al., col. 5, lines 34-40; Fujihara et al., Abstract).

Allowable Subject Matter

5. Claims 3-12, 14-16, and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: the cited references do not specifically show controlling the etching rate of the stepped structure with respect to the second III-V compound semiconductor layer as claimed and determining the etching time using the specific equation claimed. There is not motivation or suggestion to combine the references in order to meet all claims limitations.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Watanabe et al. (U.S. 2002/0119661 A1)(same assignee) wet etching an InP layer by an etchant including hydrochloric acid and acetic acid. Fujii et al. (2000-91303), (2000-091303 Translation), and Mori et al. (U.S. 5,311,534) teach using

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an etchant containing hydrochloric acid, acetic acid, and hydrogen peroxide as well known in the art.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is (703) 305-0162.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian, can be reached on (703) 308-4905. The fax phone number for this Group is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.


Maria Guerrero

Patent Examiner

August 15, 2003